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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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*Ex parte* KENNETH A. PARULSKI, MAJID RABBANI, and
MARTIN A. PARKER

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Appeal 2008-005959
Application 09/473,522[1]
Technology Center 2400

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Decided: November 13, 2009

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*Before* JOSEPH L. DIXON, JEAN R. HOMERE, and JAY P. LUCAS, *Administrative Patent Judges*.

LUCAS, *Administrative Patent Judge*.

DECISION ON APPEAL

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[1] Application filed December 28, 1999. The real party in interest is Eastman Kodak Company.

## STATEMENT OF THE CASE

Appellants appeal from a twice rejection[2] of claims 1-25 under authority of 35 U.S.C. § 134(a). The Board of Patent Appeals and Interferences (BPAI) has jurisdiction under 35 U.S.C. § 6(b).

Appellants' invention relates to digitally encrypting image data using a public/private key pairing to ensure the authenticity of a photograph. (*See* Spec. 2, ll. 19-21.) In the words of Appellants:

> The camera and system of the present invention enables a photographer or another to authenticate an image captured by the camera, to ensure that the image has not been modified. The camera and system [accomplish] this by generating a private key/public key pair within the digital camera, rather than on a separate computer, and storing the private key in a nonvolatile memory within the digital camera. This ensures that there is never a record of any type external to the digital camera that includes the private key. Because the private key is not made available to anyone at any time outside of the camera, the chances of it being compromised are substantially reduced.

(Spec. 3, ll. 18-26).

Claim 1 is exemplary:

> 1. In a digital camera of the type employing a private key to encrypt a hash of a digital image captured by the digital camera to produce an image authentication signature, the improvement comprising:

[2] Appeal is of the Non-Final Office Action mailed July 25, 2007 (Brief 1, top).

(a) a processor located within the digital camera for generating a random seed entirely from sensor noise within the digital camera and for using the random seed to generate a private key and a public key; and

(b) means for storing the private key in a memory in the digital camera for subsequent use in encryption of the hash of the digital image to produce the image authentication signature.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

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|---|---|---|
| Kaneda | US 6,046,768 | Apr. 04, 2000 (filed Jul. 18, 1996) |
| Kanai | US 6,889,324 B1 | May 03, 2005 (filed Nov. 16, 1999) |

Memorandum from Donald Eastlake, "Randomness Recommendations for Security," Request for Comments (RFC) 1750, Massachusetts Institute of Technology (MIT) (December 1994).

Schneier, Applied Cryptography 173-174, 259-261 (John Wiley & Sons 1996) (included by examiner to illustrate the inherent properties of the prior art)

## REJECTIONS

The Examiner rejects the claims as follows:

R1: Claims 1, 2, and 4-24 stand rejected under 35 U.S.C. § 103(a) for being obvious over Kanai in view of Eastlake.

R2: Claims 3 and 25 stand rejected under 35 U.S.C. § 103(a) for being obvious over Kanai in view of Eastlake and further in view of Kaneda.

Claim 1 is representative. *See* 37 C.F.R. § 41.37 (c) (vii). *See also In re McDaniel*, 293 F.3d 1379, 1383 (Fed. Cir. 2002) ("If the brief fails to meet either requirement [of 37 C.F.R. § 1.192(c)(7)], the Board is free to select a single claim from each group of claims subject to a common ground of rejection as representative of all claims in that group and to decide the appeal of that rejection based solely on the selected representative claim.").

Appellants contend that the claimed subject matter is not rendered obvious by Kanai in combination with Eastlake and Kaneda because Eastlake fails to disclose the claimed "generating a random seed entirely from sensor noise within the digital camera" (*see* Brief 8, middle) and because there is legally insufficient justification for combining Kanai and Eastlake. (*See* Brief 9, middle.) The Examiner contends that each of the claims is properly rejected (Ans. 27, bottom).

Rather than repeat the arguments of Appellants or the Examiner, we refer to the Brief and the Answer for their respective details. Only those arguments actually made by Appellants have been considered in this opinion. Arguments that Appellants could have made but chose not to make in the Brief have not been considered and are deemed to be waived.

We affirm the rejections.

## ISSUES

Both issues involve whether Appellants have shown that the Examiner erred in rejecting the claims under 35 U.S.C. § 103(a). The first issue turns on whether Eastlake discloses the claim limitation "generating a random seed entirely from sensor noise within the digital camera." The second issue

is whether there is legally sufficient justification for combining the Kanai and Eastlake references.

## FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

*Disclosure*

1. Appellants have invented an apparatus and method involving a public key encryption system to establish the authenticity of digital images created by the camera (Spec. 2, ll. 19-21). The private key/public key pair is generated by a processor in the digital camera and stored in flash memory (Spec. 6, ll. 2-4). The algorithm used to create the private key is generated from hashing "amplified dark current noise" of stored color filter array (CFA) data down to 160-bit random seed. (*See* Spec. 9, ll. 14-21.)

*Kanai*

2. The Kanai reference discloses encrypting an image using a public key/private key infrastructure within a digital camera, which Kanai refers to as "digital measurement apparatuses." (*See* col. 2, ll. 55-57 and 60-61; col. 7, ll. 40-41; Fig. 5, S202; *see also* col. 4, ll. 31-35.)

*Eastlake*

3. The Eastlake reference discloses using the random noise generated by a camera "with the lens cap on" (*see* p. 14, § 5.3.1, "Using Existing Sound/Video Input") as a "physical source of unpredictable numbers." (*See* p. 6, § 5, "Hardware for Randomness.") Eastlake further discloses

gain amplification. (*See* p. 14, § 5.3.1, "Using Existing Sound/Video Input.")

*Kaneda*

4. The Kaneda reference discloses a variable amplifier, "AMP3" (col. 17, l. 37).

PRINCIPLES OF LAW

Appellants have the burden on appeal to the Board to demonstrate error in the Examiner's position. *See In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) ("On appeal to the Board, an applicant can overcome a rejection [under § 103] by showing insufficient evidence of prima facie obviousness or by rebutting the prima facie case with evidence of secondary indicia of nonobviousness.") (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)).

"What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under *§ 103*." *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 419 (2007). To be nonobvious, an improvement must be "more than the predictable use of prior art elements according to their established functions." *Id.* at 401.

ANALYSIS

From our review of the administrative record, we find that the Examiner has presented a prima facie case for the rejections of Appellants' claims under 35 U.S.C. § 103. The prima facie case is presented on pages 3 to 13 of the Examiner's Answer. In opposition, Appellants present numerous arguments.

*Arguments with respect to the rejection of claims 1, 2, and 4 to 24 under 35 U.S.C. § 103(a) [R1]*

"Appellants submit that the Examiner has mischaracterized the Kanai reference in arguing that Kanai teaches the recited processor for generating a random seed." (Brief 7, top).

In reply, the Examiner points out in the Examiner's Answer that Kanai is cited for disclosing generating a public key/private key pairing. (*See* col. 7, ll. 40-41; Ans. 3, bottom.) The Examiner also finds that Kanai discloses the ability to generate random numbers. (*See* col. 8, ll. 2-3; Ans. 14, middle.) The Examiner merely cites Kanai for disclosing the capability of Kanai's digital measuring apparatus to generate random numbers as a first step in creating the public key/private key pairing (*id.*). Next, the Examiner finds that Eastlake discloses using thermal noise from "a camera with the lens cap on" as a source for generating random numbers (p. 14, § 5.3.1. "Using Existing Sound/Video Input"). We remind Appellants that attacking the references individually, instead of in combination, will not overcome a rejection for obviousness over two or more references. We thus find unpersuasive Appellants' argument that the Examiner mischaracterized the Kanai reference because the Examiner clearly proposes that Appellants' claimed "processor for generating a random seed" is disclosed by a combination of Kanai and Eastlake, and not by Kanai alone.

Appellants then argue: "There is no teaching or suggestion in Eastlake that the camera … [uses] its own sensor noise to generate its own random seed" (Brief 8, middle) (emphasis omitted).

The Eastlake reference is cited by the Examiner in the Answer for its disclosure of the particulars of the algorithm described by Appellants' claim limitation "generating a random seed entirely from sensor noise within the digital camera," as recited in exemplary claim 1. (*See* Ans. 3, bottom.) Specifically, the Examiner cites to pages 4 and 14 of the Eastlake reference, which describes encryption techniques relying upon a camera's inherent noise as a source for random-number generation (Ans. 4, top to middle). The Examiner did not cite Eastlake's camera for generating a random seed, as argued by Appellants. (*See* Ans. 3, bottom to 4, middle.) Instead, the Examiner's proposed combination of references involves Kanai generating a key pair, where the source of numbers for the random seed to generate the key pair is Eastlake's thermal noise from a camera with its lens cap on (*id.*).

We thus find that the Kanai reference discloses encrypting an image using a public key/private key infrastructure within a digital camera, which Kanai refers to as "digital measurement apparatuses" (FF#2). We find that the Eastlake reference discloses using the random noise generated by a camera "with the lens cap on" as a "physical source of unpredictable numbers" (FF#3). Since Kanai's processing is enclosed in the digital measurement apparatus and results in a public key/private key pairing (FF#2), we find that Appellants' "processor located within a digital camera" reads on Kanai's processing in a digital measurement apparatus (*i.e.*, a digital camera). Moreover, we find that Eastlake's use of random noise as a physical source for encryption meets Appellants' claim limitation "generating a random seed entirely from sensor noise within the digital camera" since the reference discloses using a camera's random noise as a source for encrypting data.

Together, Kanai and Eastlake meet Appellants' claim limitation "a processor located within the digital camera for generating a random seed entirely from sensor noise within the digital camera and for using the random seed to generate a private key and a public key." We thus find no error in the Examiner's analysis regarding the Examiner's treatment of Eastlake and Kanai.

Next, Appellants argue that there is legally insufficient justification for combining Kanai and Eastlake. (*See* Brief 8, middle).

The Examiner finds that there is a reason having a rational underpinning to combine the references: "The motivation for doing so would be to use a strong portable source of unpredictable numbers" (Ans. 6, top; Eastlake, Abstract and page 10, § 5, "Hardware for Randomness").

"What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under *§ 103*." *KSR*, 550 U.S. at 419. To be nonobvious, an improvement must be "more than the predictable use of prior art elements according to their established functions." *Id.* at 401. Since both references are directed to digital encryption of image data (*see* FF#2 and FF#3) and the Examiner has stated a rationale for combining the references, we find unconvincing Appellants' argument that there is "insufficient objective evidence of motivation to combine." (Brief 8, middle). Kanai plainly discloses encrypting digital image data in a digital measurement device (*id.*). The Eastlake reference not only discloses use of noise as the source for random numbers for purposes of digital encryption but also specifically identifies a camera with its lens cap on as a source of noise (*id.*). Thus, Eastlake's thermal noise generated from a camera with its lens cap on is no different from the "random noise level" resulting when "an image is

captured with the shutter 15 closed," as disclosed in the Specification. (*See* Spec. 9, ll. 9-15.) Kanai's disclosure of public key/private key generation and Eastlake's use of thermal noise for a strong source of random numbers are nothing more than predictable use of prior art elements according to their established functions. In light of the teachings of *KSR v. Teleflex*, we decline to find error in the Examiner's stated rationale for combining the references.

In the interest of judicial economy, we refrain from addressing Appellants' numerous other arguments (*see* Brief 9, bottom to 14, middle), which, although carefully considered by the Board, were found to be similarly unconvincing for reasons expressed by the Examiner in the "Response to Arguments" section of the Answer on pages 13 to 27.

*Argument with respect to the rejection of claims 3 and 25 under 35 U.S.C. § 103(a) [R2]*

Dependent claim 3 recites, in relevant part, "a variable gain amplifier" and "the processor causing the variable gain amplifier to be in a high gain condition when the initial test image is captured."

In their own words, Appellants argue: "[O]ne skilled in the art would not [have been] motivated to look to amplifiers specifically used to amplify a hand vibration angle detection signal for teachings related to amplification of captured test images." (Brief 15, middle).

The Examiner points out in the Answer that "all that would be required to render the claim obvious is to find … that digital cameras could possess variable gain amplifiers." (Ans. 26, middle). We find that the

Kaneda reference discloses a variable amplifier, "AMP3" (FF# 4). Eastlake discloses gain amplification (FF#3.) The mere fact that the Kaneda reference discloses using the variable amplifier for "hand vibration angle detection," as asserted by Appellants, would not have precluded an artisan from using the variable amplifier for other, predictable purposes (*i.e.*, gain amplification) known in the art at the time the claimed invention was made. Since the combination of Kaneda's variable amplifier and Eastlake's disclosure of gain amplification provide sufficient teachings for the argued claim limitations, we find unconvincing Appellants' argument. Accordingly, we find no error in the Examiner's analysis.

## CONCLUSION OF LAW

Based on the findings of facts and analysis above, we conclude that the Examiner did not err in rejecting claims 1-25.

## DECISION

The Examiner's rejections [R1 and R2] of claims 1-25 are Affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

peb

Appeal 2008-005959
Application 09/473,522

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